Frequently Asked Questions - Three Mile Island Accident - March 28, 1979

1: **What actually happened and why?**

The reactor's fuel core became uncovered because coolant water dropped below the top of the fuel core and more than one-third of the fuel melted. Inadequate instrumentation and training programs at the time hampered operators' ability to respond to the accident. The accident was accompanied by communications problems that led to conflicting information available to the public, contributing to the public's fears.

The safety provisions designed into the reactor system worked. The containment building contained the reactor fuel as designed. And despite melting of about one-third of the fuel, the reactor vessel itself maintained its integrity and contained the damaged fuel.

2: **How many people died and how many people are likely to develop cancer as a result of the accident at Three Mile Island?**

No one died as a result of the TMI-2 accident. The accident caused concerns about the possibility of radiation-induced health effects, principally cancer, in the area surrounding the plant. Because of those concerns, the Pennsylvania Department of Health maintained for 18 years a registry of more than 30,000 people who lived within five miles of Three Mile Island at the time of the accident. The state's registry was discontinued in June 1997 without any evidence of unusual health trends.

3: **What steps have been taken to prevent a recurrence of such a nuclear accident?**

The accident led to the formation of the Institute of Nuclear Power Operations by the owners of all operating nuclear power plants in the U.S. as a non-profit organization dedicated to improving the operation of all nuclear plants in the U.S. INPO, headquartered in Atlanta, sets standards for safe nuclear power operations and leads annual inspections of all plants.

INPO also formed the National Academy for Nuclear Training which sets standards for the training and certification of nuclear plant operations and maintenance workers.

INPO has been so successful that its model was replicated globally in the formation of the World Association of Nuclear Operators (WANO), headquartered in London, which sets standards of performance for all 400-plus nuclear plants worldwide.

4: **Why do we still have nuclear plants in operation today? Why don't we just close down all nuclear power plants?**

Nuclear power plants in the U.S. produce about 20 percent of the electric power used today and at the lowest costs without emitting any air pollutants. We need their clean, low-cost power to maintain our national economy and today's quality of life.

5: **What is the environmental and health value of nuclear energy today?**

Today's 103 operating nuclear plants within the U.S. have tremendous environmental and health value. Nuclear is the only way to generate large volumes of electric power consistently at low cost without polluting the air. While we need all the renewable energy we can get, solar and windmills cannot produce power on a large scale to meet our economy's needs. Fossil plants, such as coal- and natural gas-fired, in most instances cost more and produce air pollutants, including carbon dioxide. Natural gas is fuel source that is becoming scarce within the lower 48 states of North America.

6: **Isn't spent nuclear fuel, which remains dangerous for thousands of years, a huge problem we are leaving to our future generations?**

Actually, used nuclear fuel is quite manageable. ***All the used fuel produced by the U.S. nuclear power industry in 40 years of operation - about 40,000 metric tons - would, if stacked end to end, cover an area the size of a football field about five yards deep.***

Since their first day of operation, all U.S. nuclear plants have been paying one tenth of a cent per kilowatt-hour generated into the U.S. Nuclear Waste Fund to pay for permanent storage of all used fuel. Nuclear plants have so far paid in about $20 billion and, because of those payments, are the only industry in America that has paid the cost of disposing of its waste.

The Department of Energy, after 20 years of study, has chosen Yucca Mountain, Nev., as the permanent disposal site for all nuclear waste. DOE is now preparing an application to the U.S. Nuclear Regulatory Commission for a license to build and operate the facility. Although court challenges are still under way, DOE is scheduled to begin receiving used fuel in 2010. Other nations do not have a used fuel disposal problem because they reprocess their used fuel, reclaiming the approximately 97% of the fuel which is unburned for new fuel rods.

7: **Didn't we come close to having a China Syndrome on our hands at TMI-2?**

The accident actually showed there is no such danger as described in the 1979 movie, China Syndrome. TMI-2 also fostered a better understanding of what happens when fuel melts, and demonstrated the improbability of a China Syndrome meltdown breaching the reactor vessel or the containment building. About a third of the TMI-2 fuel did melt and the containment building did its job of containing it. There was no meltdown like a China syndrome.

8: **How much radiation did people living around TMI-2 get?**

The average radiation dose to people living within 10 miles of the plant was **eight millirem**, and no more than 100 millirem to any single individual. **Eight millirem is about equal to a chest X-ray**, and 100 millirem is about a third of the average background level of radiation received by U.S. residents in a year.

9: **What were the long-term health impacts of the TMI-2 accident?**

Several health studies found there was no long-term adverse effect on the health of the population living around TMI. Applying the accident's lessons produced important, continuing improvement in the performance of all nuclear power plants worldwide.

10: **Why don't we design some new types of nuclear plants that are more advanced?**

Actually, we are designing new plants. The next generation of nuclear plants has already been designed to be safer, as well as cheaper to build and operate. In fact 32 new plants are being built around the world but none are located in the U.S. Many scientists fear that the U.S. is falling behind in advanced nuclear power technology, which could reduce our dependence on foreign oil and gas.

There is also an even more advanced nuclear reactor, called a high temperature gas-cooled reactor, that would be meltdown proof and terrorist hardened because it could be built underground. It would be cooled by a gas, rather than with water like today's light water reactors. The gas could be helium, an inert element that does not become radioactive. Thus if it escaped through a leak, it would just be like the helium in a balloon. Such advanced reactors, like today's reactors, would not emit air pollutants.

Further, the high temperature reactors would operate at a high enough temperature, they could thermo-split water into hydrogen and oxygen, making large volumes of hydrogen at low cost without release any air emissions. They could be the source of low-cost hydrogen to fuel a hydrogen economy. Such advanced reactors would run on nuclear fuel with no ties to foreign oil or gas, increasing our energy independence.

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